Low Flow ORC Conversion

INSTALLATION PROCEDURE

WARNING: DO NOT install the low flow ORC in conjunction with the Minimum O_2 Flow Elimination option. Contact NAD's Technical Support Group to make arrangements to reinstall the Minimum O_2 Flow feature.

NOTE: This procedure applies to 2, 3 and 4 gas machines with E-Z plumb piping.

1. Turn the System Power switch to ON, and disconnect all pipeline hoses.
2. Close all cylinder valves except the O_2 cylinder valve.
3. Set the oxygen flow rate to 5 l/min.
4. Open the other flow control valves to drain pressure from the system.
5. Close the O_2 cylinder valve, and close all flow control valves. Press the O_2 Flush button to drain oxygen pressure from the system.
6. Turn the System Power switch to STANDBY and remove AC power from the machine.
7. Remove the flowmeter housing back cover.

NOTE:
For 2-gas machines, skip to Step 15.

8. Remove the vapor box front cover. On NM2C and NM4 machines, remove the vapor indicator PCB assembly from the cover. This assembly will later be attached to the new front cover with the original mounting screws. See Figure 1.

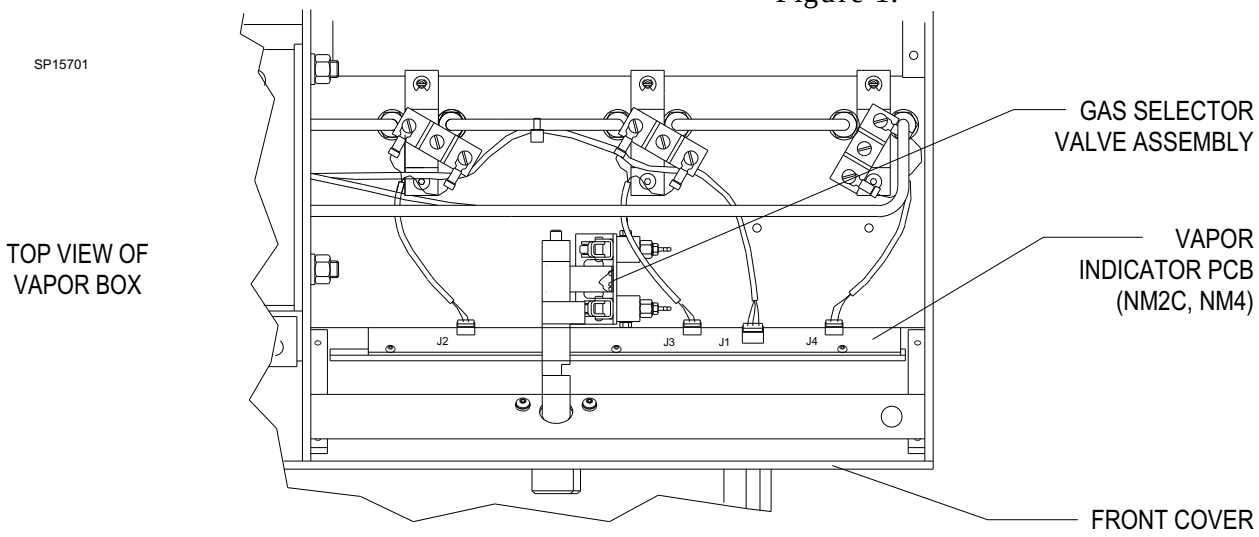


Figure 1: VAPOR BOX - 3 AND 4-GAS MACHINES

INSTALLATION PROCEDURE (continued)

9. Remove the vapor box back cover.

10. Remove the two screws retaining the gas selector valve assembly to the vapor box, and remove the assembly from the box.

11. Remove all poly tubing connections from the valve assembly.

12. Cut the tie straps securing the poly tubing to the copper tubing in the vapor box.

13. Cut the tie straps securing the pilot actuator assembly (minimum flow valve) to the copper tubing in the flowmeter housing. See Figure 2.

14. Disconnect all poly tubing connections from the pilot actuator and from all OFPDs. Remove all associated poly tubing.

15. Remove the poly tube connections from both sides of the 4-way fitting.

16. Remove the flow restrictor from the right side port of the 4-way fitting (as viewed from the back of the flowmeter housing), and replace it with restrictor P/N 4110738-007 (brown). See Figure 3.

17. Remove the three ORC mounting screws from the flowmeter assembly.

NOTE: Refer to Figure 4 for export models with the O_2 flow control valve on the left (as viewed from the front of the machine).

18. Disconnect the poly tube from the ORC and remove the ORC assembly from the machine.

19. Locate the new ORC assembly supplied in the kit.

20. Connect a 6 in. length of poly tubing with a blue N_2O label, from the side port of the ORC to the bottom port of the ORC. See Figure 3. Secure each connection with a press-on hose clamp.

21. Install the new ORC on the flowmeter assembly. Ensure that the O-rings are correctly in place.

22. Attach the tube that was disconnected in Step 18 to the O_2 port of the ORC, and secure the connection with a press-on hose clamp.

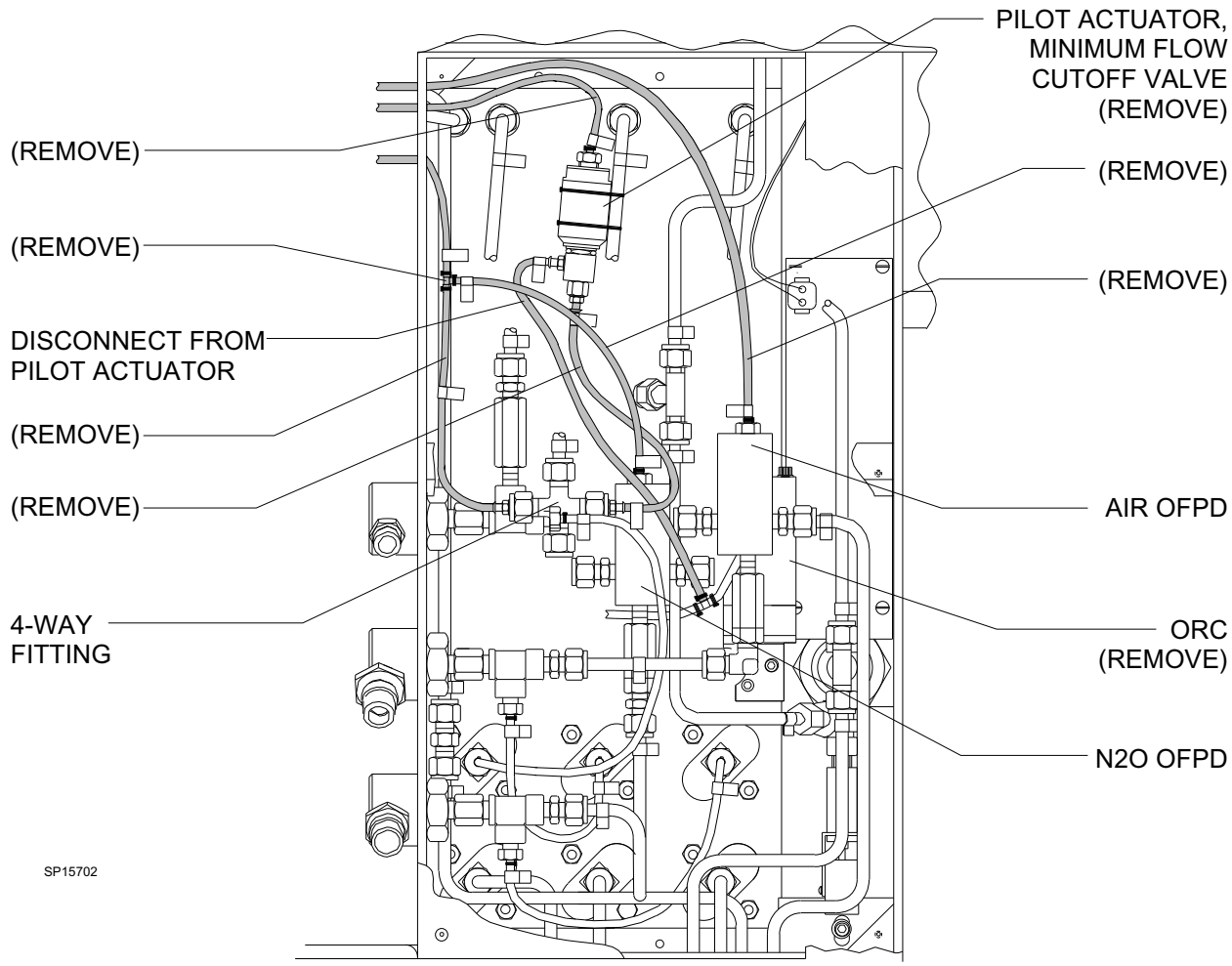
23. Connect the O_2 poly tube (see Figure 3) to the hose barb on the restrictor side of the 4-way fitting. Secure this connection with a press-on hose clamp.

24. On 2-gas machines, reconnect the poly tubing from the OFPD to the other hose barb on the 4-way fitting, and secure the connection with a press-on hose clamp. Proceed to the TEST section.

25. On 3 and 4-gas machines, locate the hose assembly that includes poly tubing in 10 in. and two 3 in. lengths. Ensure that each piece of tubing has a green O_2 label.

26. Connect the 10 in. tube to the non-restrictor (left) side of the 4-way fitting. Secure this connection with a press-on hose clamp.

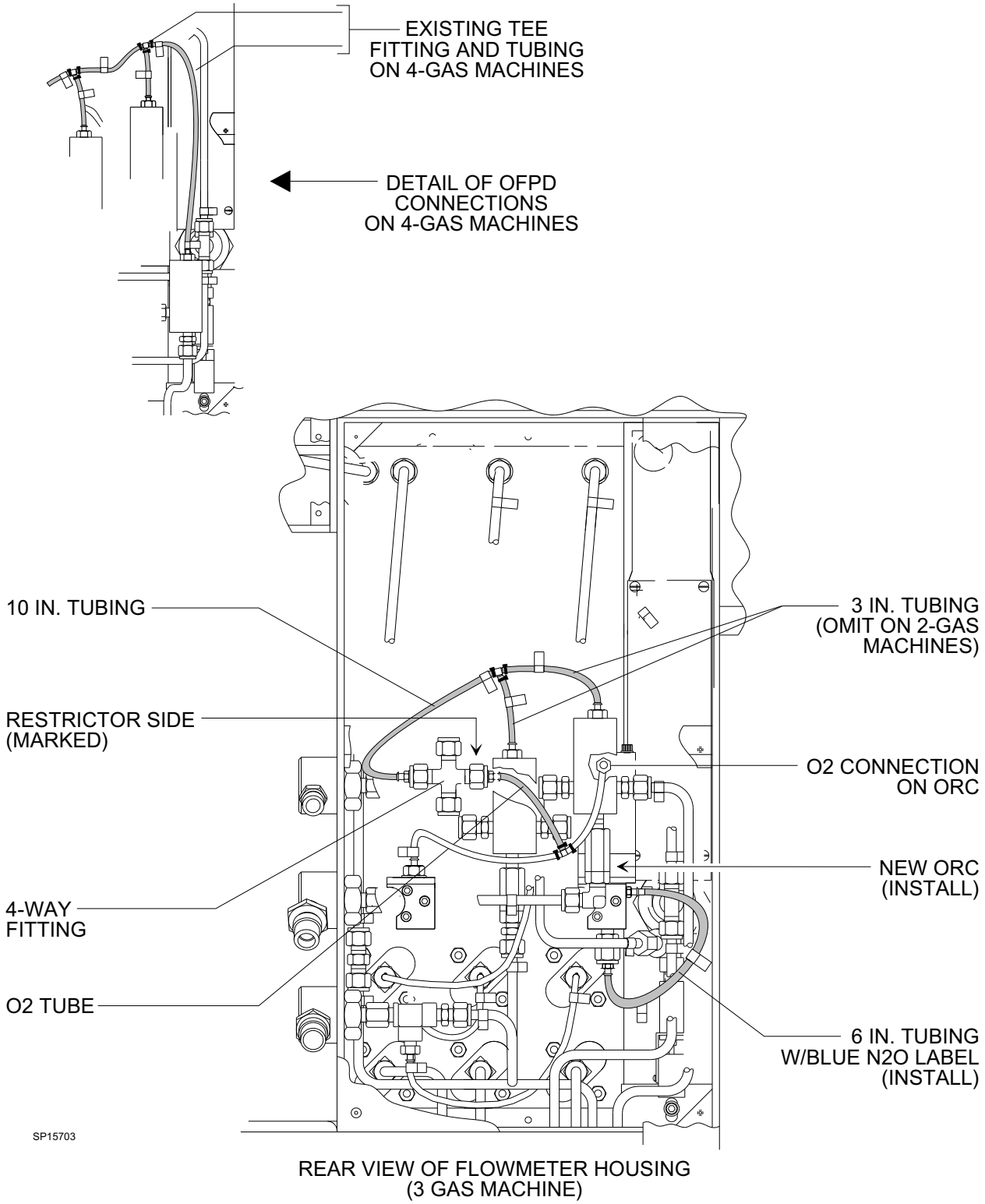
INSTALLATION PROCEDURE (continued)



REAR VIEW OF FLOWMETER HOUSING

Figure 2: REMOVAL OF EXISTING TUBING AND ORC

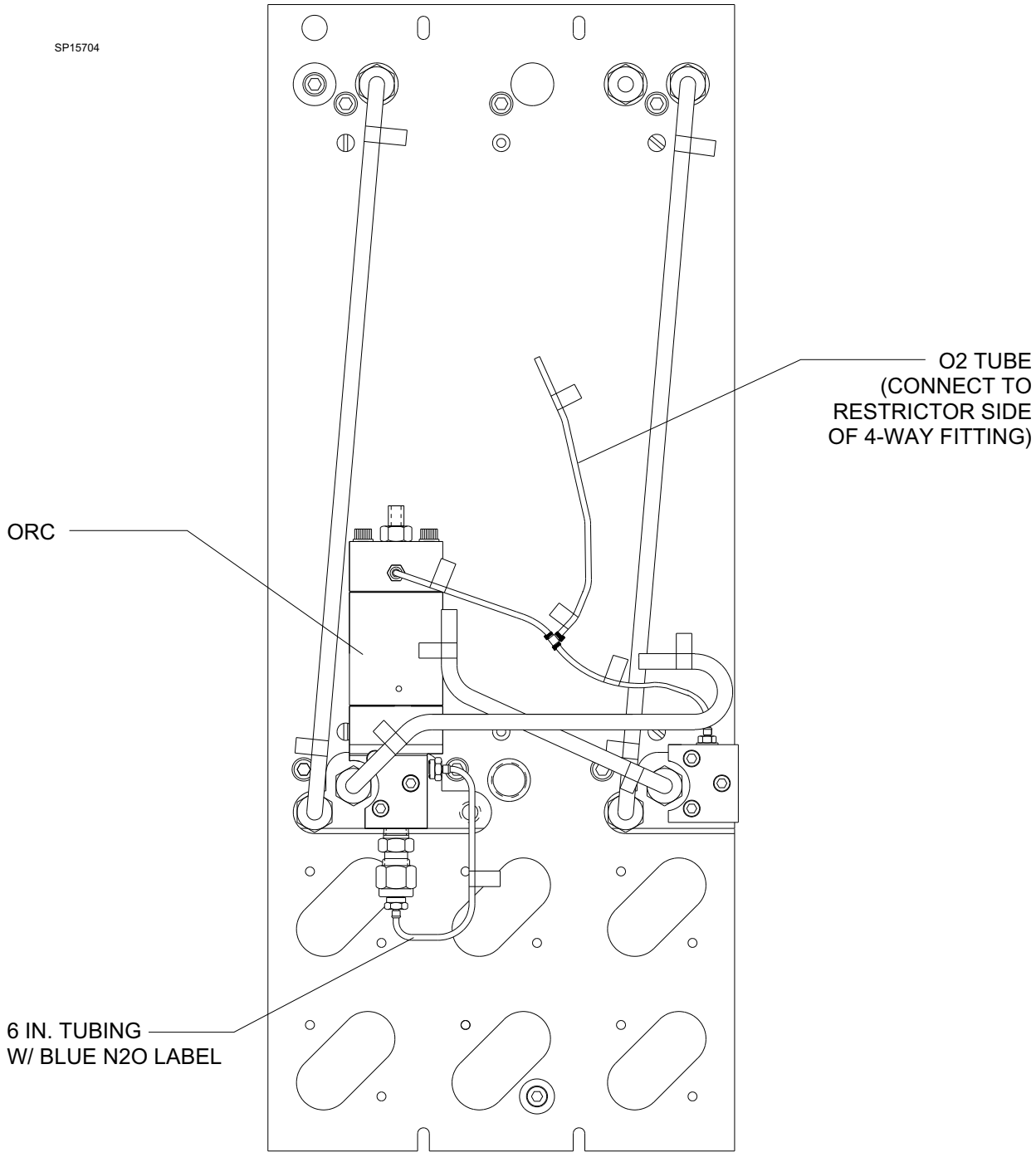
INSTALLATION PROCEDURE (continued)


EXISTING TEE FITTING AND TUBING ON 4-GAS MACHINES
DETAIL OF OFPD CONNECTIONS ON 4-GAS MACHINES
10 IN. TUBING
3 IN. TUBING (OMIT ON 2-GAS MACHINES)
RESTRICTOR SIDE (MARKED)
O2 CONNECTION ON ORC
NEW ORC (INSTALL)
4-WAY FITTING
O2 TUBE
6 IN. TUBING W/BLUE N2O LABEL (INSTALL)
SP15703

REAR VIEW OF FLOWMETER HOUSING
(3 GAS MACHINE)

Figure 3: INSTALLATION OF NEW ORC AND TUBING

INSTALLATION PROCEDURE (continued)



REAR VIEW OF FLOWMETER SUB-ASSEMBLY:
EXPORT MODELS WITH O2 FLOW CONTROL VALVE ON LEFT
(AS VIEWED FROM FRONT OF MACHINE) OF FLOWMETER HOUSING

Figure 4: ORC ARRANGEMENT ON MACHINES WITH LEFT O_2 CONTROL

INSTALLATION PROCEDURE (continued)

27. On 3-gas machines, connect each 3 in. tube to an OFPD. Secure each connection with a tie strap if the OFPD has a nylon hose barb, or a press-on hose clamp if the OFPD has a brass hose barb.

    On 4-gas machines, connect one 3 in. tube to the N_2O OFPD and connect the other 3 in. tube to the existing tee fitting connected to the other two OFPDs. Secure the tee fitting connection with a tie strap.

28. On NM2C and NM4 machines, attach the vapor indicator PCB to the new vapor box front plate with vapor indicator windows, using the hardware that was previously removed.

    On NM2B machines, use the vapor box front plate without vapor indicator labels. Each type of front plate is included in the kit. Install the front plate using the hardware that was previously removed.

29. Reinstall the vapor box back cover.

    Proceed to the TEST section.

TEST

Leak Test

1. Remove the 15 mm connector from the fresh gas outlet.
2. Connect a test 15 mm connector with a pressure gauge and BP bulb to the fresh gas outlet.
3. Pressurize the system to 50 cm H_2O.
4. After 30 seconds the pressure in the system shall be ≥40 cm H_2O.
5. Remove the test 15 mm connector.

Flow Test

6. Connect all pipeline supplies and open all cylinder valves.
7. Turn the System Power switch to ON.
8. Verify that the O_2 minimum flow is 175 ± 25 l/min.
9. Verify that O_2 is able to flow throughout its full range.
10. Set the O_2 flow to 4 l/min.
11. Verify that the other gasses are able to flow throughout their full range.
12. Close all flow control valves.
13. Fully open the N_2O flow control valve, and record the N_2O flow rate.
14. Close the N_2O flow control valve.
15. Set the O_2 flow to 10 l/min., and set the N_2O flow to 10 l/min.
16. Gradually close the O_2 flow control valve until the N_2O flow rate is the same as in Step 13. At this point the O_2 flow rate should be within 250 to 400 ml/min. If the O_2 flow rate is outside this range, perform an ORC adjustment and repeat the test.

O_2 Concentration Test

17. Close the N_2O flow control valve, and set the O_2 flow rate to 4 l/min. With a calibrated O_2 monitor, verify that the O_2 concentration at the fresh gas outlet is 100% ±3%.
18. Close the O_2 flow control valve , and fully open the N_2O flow control valve. Verify that the O_2 concentration is 22% to 30%.
19. Perform a complete PMS on the machine.

RETURN TO SERVICE PROCEDURE TABLE OF CONTENTS
RETURN TO CD-ROM TABLE OF CONTENTS

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